

3.4.6 North Atlantic Region

A large contingent of government and academic representatives of the region attended the North Atlantic workshop in Groton, Connecticut. This group identified a wide spectrum of needs ranging from the inventory of living marine resources in the near shore environment to exploration of areas of abrupt bottom topography with an emphasis on the relationship between the geomorphology and the abundance, diversity, and novelty of biological inhabitants. Regional marine archeological needs were of interest within the workshop and were well represented by knowledgeable participants.

Additional exploration needs identified by these participants included the study of the transitional areas near the continental shelf, the abundance, location, and diversity of corals and fish, and exploration of gas hydrates provinces. Participants recognized the need for high-resolution bathymetric mapping but sought assurances that mapping would not be emphasized by the OE program at the expense of other ocean exploration needs. The attendees also examined the increased need for expertise in taxonomy of marine resources and possible solutions for meeting the demand for these resources.

Results from the North Atlantic workshop are provided in Table 3-8. Exploration targets of interest nominated by participants are illustrated in Figure 3-8.

Table 3-8. North Atlantic Region Workshop Results

North Atlantic Workshop	
Standard Package: Class I/II Vessel with acoustic mapping; Dive capability (ROV / AUV / Submersible) with imagery / video & sampling equipment (Not Only ROV / AUV / Sub); Multi-beam; ADCP; Precise position system; Outreach capability; Education component; Deep Standard Package: Class I/II Vessel with acoustic mapping; Dive capability (ROV/AUV/Submersible) with imagery/video and sampling equipment; Precise positioning system; Navigation mapping technology; Coastal Standard Package: Class III/IV Vessel; Wet diving chamber/compressor; DMT; Dive master; Acoustic mapping; sidescan; Precise positioning system; Navigation mapping technology	Standard Partners: NURC; Sanctuary Program; NMFS; USGS; Sea Grant; Institute for Exploration (IFE); NOS; NURP; UNOLS

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
183	Archeology	Regional archeological assessment; cultural resources, chronology site ID	Distribution of wrecks; structures; aircraft; items of cultural impact; dump sites; identify all cultural resources with in a region; characterization of bio/geo/chemical at sites	Regional assessment sampling strategy needed (sites with a range of maritime landscapes); regulated areas	Standard Package; High Resolution Survey – SUBS / ROVs /AUV's; magnetic Acoustic sensors	USACE; State Governments; Academia; Aquariums; not-for-profit entities; USCG; Navy; commercial interests
187	Archeology	Character of deep water archeological sites	Wrecks; structures; cultural resources; Priority to older targets; local biota	Target identified by broader area of survey - Virginia Capes;	Standard Package; deep water sub's ROV's / AUV's / imagery & video; remote manipulator; magnetic	Standard Partners
204	Archeology	Shipwrecks (5-10K off New England)	Location; ID & characterize	Close to shore; fishing banks (Georges Banks; Jeffrey's Ledge; Gulf of Maine; shipping lanes - close to shore; "right down the list"	Standard Package; magnetometer; archival technologies	Standard Partners

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
205	Archeology	Submerged prehistoric sites	Location; ID & characterize; which are still intact; paleogeography; paleo communities; paleo biological assemblages	Shallower than 120m isobaths; near major drainages; coastal embayment; areas of intense fishing activity	Standard Package; Geologic mapping; coring; sub-bottom profiling; sidescan; magnetometer; AUV; Also local knowledge	Standard Partners
222	Archeology	Shipwreck aggregation sites	Not well documented	Nantucket Shoals; Hatteras; Graveyard of Atlantic; Stellwagen Bank; Boston Harbor entrance; Long Island Sound; Buzzards Bay; Narragansett Bay; entrance to Chesapeake Bay; outer Cape Cod; Casco Bay; & New York Harbor	Standard Package	Standard Partners
190	Benthic Environment	Knowledge of deep benthic community	Characterize biology and geology; bottom interactions; ecology dynamics; deep cold corals	Topographic feature of interest	Standard Package; deep submersibles; observations; AUV's; acoustic imaging; chemical sampling techniques	Standard Partners
215	Benthic Environment	Abyssal plain	Not well documented	South of Oceanographer & east of Norfolk Canyon	Standard Package	Standard Partners
195	Corals - Deep Water	Knowledge of deep and or cold water corals	Deep cold corals; location; health; bio/geo/chemical environment	Bear Seamount; Oceanographer Canyon; Lydonia Canyon; Nova Scotia & New Brunswick	Standard Package; Magnetic Sensors; sub-bottom profilers; chemical sensors; "tailored" AUV/ Sub/ ROV's	Standard Partners
193	Currents & Water Masses	Knowledge of physical & biological processes near fronts; eddys, warm and cold rings	Intersections between layers; relationships to biota; air-sea patterns / interactions; impact of bottom boundary; archeological application; magnetic sensors; data mining; bottom mapping & characterization capability; new sampling protocols; multi-line arrays and multi-sensor arrays	Gulf Stream; Labrador; Gulf of Maine; Long Island Sound	Standard Package; remote sensing; fixed sensors; sensor arrays; AUV's; magnetic sensors; data mining; bottom mapping & characterization capability; multi-line/sensor arrays	Sea Grant Program; Aquariums (Maritime Aquariums @ Norwalk, Mystic, Baltimore, & New England...)

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
219	Ecosystem - Abrupt Topography	Gravel cobble bottom - continuous features vs. discrete	Not well documented	Corsair; Oceanographer; & Hydrographer Canyons; Stellwagen & Georges Bank; Great South Channel; Jeffrey's Ledge	Standard Package	Standard Partners
213	Ecosystem - Banks & Basins	Banks	Not well documented	Stellwagen & Georges Bank; Nantucket Shoals; Tillies & Browns Banks; Banquero & Emerald Banks	Standard Package	Standard Partners
214	Ecosystem - Basins & Banks	Basins	Not well documented	East & west Tillies Basin; Georges; Jordan; Wilkinson & Stellwagen Basins	Standard Package	Standard Partners
217	Ecosystem - Basins & Banks	Gravel windows - sediment disturbed & gravel exposed	Not well documented	Stellwagen Basin	Standard Package	Standard Partners
221	Ecosystem - Basins & Banks	Glacial scoured areas	Not well documented	Northeast Stellwagen Bank; Jordan Basin	Standard Package	Standard Partners
192	Ecosystem - Canyons	Knowledge of submarine canyons	Transport mechanism; habitat diversity; sediment transport; nutrient transport	Continental Margin; Hudson Canyon; Lydonia Canyon; Varied Geomorphology; Gradient of Human influence	Standard Package; acoustic mapping; non-destructive investigations; robotic manipulation; sub-bottom profiling; tools for sample & artifact recovery; interpretation tools; spectral analysis tools; data mining; laser line scan; Critter Cams	Standard Partners
211	Ecosystem - Canyons	Submarine canyons	Not well documented	All major canyons e.g. Georges Bank canyons and mid-Atlantic canyons e.g. Oceanographer; Veatch; Baltimore; Norfolk; and Wilmington Canyons; Pueblo village communities and the canyon axis; boulder fields; slip stone outcrops	Standard Package	Standard Partners
220	Ecosystem - Channels	Channels	Not well documented	Great South Channel; Northern Channel	Standard Package	Standard Partners

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
186	Ecosystem - Seamounts / Ridges	Knowledge of impact of Seamounts on ocean dynamics; also other abrupt topography	Ocean currents; ecosystems; biogeography; biodiversity	Bear Mount; New England Seamount chain; Mid Atlantic Ridge; Cashes Ledge; other small features	Standard Package; Sub/ ROV's/ AUV's video imagery; sampling systems; acoustic mapping	Standard Partners
210	Ecosystem - Seamounts / Ridges	Seamounts	Systematic documentation	All seamounts e.g. New England seamount chain	Standard Package;	Standard Partners
182	Ecosystem - Shorelines to Ledges	Knowledge of near-shore environments	Inventory; characterize & measure; habitats; bathymetry; bio/geo/chem of shallow water and processes near fronts - colds corals; archeology;	Coastal New England	Shallow water mapping; sediments; remote sensing; in turbid water; small vessels; autonomous vehicles; aircraft archeological application; magnetic sensors; data mining; bottom mapping & characterization capability; new sampling protocols; multi line arrays and multi sensor arrays	USACE; State Governments; Academia; Aquaria; not-for-profit entities; USCG; Navy; commercial interests
212	Ecosystem - Shorelines to Ledges	Ledges	Not well documented	Jeffrey's Ledge; southern Cashes Ledge; Fippennies; Platts; all along the coast of Maine e.g. smaller coastal ledges	Standard Package	Standard Partners
200	Ecosystem - Slopes	Study transitional areas between biogeographic areas & shelf slope regions	Species distribution and ranges; species dynamics; tropic interaction; invasive; patterns	Georges Bank; Cape Hatteras; 350m isobaths; any biogeographic breaks	Standard Package	Standard Partners
216	Ecosystem - Slopes	Slopes (600 to 4000 ft)	Not well documented	Slopes adjacent to ID canyons or seamounts	Standard Package	Standard Partners
207	Episodic Events	Observing episodic events & rare species e.g. storms, blooms	Short-term events - frequency; strength; intensity; impact; magnitude; compare & contrast	Marine Protected Areas; abrupt bottom topography; areas representative of a range of topographies e.g. ledge vs. flat bottom; e.g. Gulf of Maine; marine mammal habitat	Camera; observation technology	Standard Partners

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
198	Extreme Environments - Vents, Seeps & Volcanoes	Chemosynthetic communities (subsurface - down several km): hydrate vents, seeps and vent communities	inventory and characterize; isolated ridge system; new biota; larger geographic context; physical & chemical systems	Mid-Atlantic Ridge	Standard Package; multibeam geophysical techniques; sampling techniques; satellite imaging; towed vehicles; subs; AUV's look at new technologies	Standard Partners
199	Extreme Environments - Vents, Seeps & Volcanoes	Knowledge of micro-organisms in the deep sub-bottom	Sea floor Biosphere	Deep water	Standard Package; deep sampling technology; Ocean Drilling Program (ODP)	Standard Partners
196	Geology & Geomorphology	Knowledge of physical processes related to geomorphology	Mass-gravity movement; turbidity flows; hydrate beds; slope instability; chemical analysis	US Continental Margin; Hudson Canyon region;	Standard Package; Sub/ROV/AUV imagery; seismic survey; acoustic mapping	Standard Partners
218	Geology & Geomorphology	Protected paleo-shorelines	Not well documented	South of Long Island & Nantucket; Gulf of Maine; Weymouth	Standard Package	Standard Partners
197	Human Impacts	Knowledge of impact of fishing on ocean regions	Health of benthic habitat; CoML; archeological impacts; history of technology	Grand Banks; Georges Bank; Gulf of Maine; Area where fisheries are expanding into	Standard Package; Sub/ ROV's/ AUV's video imagery; sampling systems; acoustic mapping	Standard Partners
188	Marine Organisms	Distribution of migration & abundance of large, highly mobile biota	Marine mammals; giant squid; other unknown species; large deep water sharks	Beyond continental margin	Survey techniques; tagging & tracking; acoustic imaging; AUV imaging	Standard Partners
194	Marine Organisms	Distribution migration & abundance of gelatinous plankton	Pelagic Plankton; Vertical migration patterns	Seamounts; canyons; along shelf margin	Sampling technology; AUV's	Standard Partners

North Atlantic Workshop Results						
ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
201	Marine Organisms	Ecosystem engineers and foundation species (corals, tile fish)	Abundance; location; diversity; new species; establish patterns; expertise in taxonomy of marine resources; education	For corals: shelf break; canyons; edges of basins; seamounts; deep and inaccessible; for mussels: Grand Manan Basin; upper slope environment	Standard Package; Plus time series observations; national & international standards; collections management; scholarship programs; training in fieldwork for applicable disciplines; sponsoring existing entities with expertise; expert system can help enable; graduate fellowship programs; establish positions (FTE's) for populations by existing professionals; service academies; establish accommodating university policies; establish separate; collaborative institute	Standard Partners; Educational Institutions: Sea Grant; Museums; Non-Profits
203	Marine Organisms	Novel feeding relationships		Coastal regions near algal beds; offshore basins; depositional environment; marine mammal hotspots	Sampling & stable isotope analyses for food pathways; remote sensors for marine mammals; Critter Cam	Standard Partners
208	Marine Organisms	Observing rare species	For fish & marine mammals: migratory & threatened species e.g. location of bottleneck dolphins; unusual spawning; general behavior	Marine Protected Areas; fish aggregation areas e.g. Stellwagen Bank; ledges; fishing grounds; plane used by marine animals	Cameras; observation technology	Standard Partners
202	Ocean Resources - Bioprospecting	Bioprospecting	Biotech industry	Areas of high diversity; abrupt topo changes; deep within our region and tropical;	Bioprospecting technology; standard sampling technology that capture and keep specimen alive	Standard Partners
184	Ocean Resources - Energy & Minerals	Knowledge of gas hydrates provinces	Process of gas hydrates potential resources effects of gases on chemosynthetic communities; climate impacts; slope quality	US EEZ; Hudson Canyon Region; (fiber Optic Hub)	Submersibles/ROV's; sampling methods	Standard Partners

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ID	Category	Information Need/Gap	What	Where	Enabling Technologies	Partners
209	Ocean Resources - Energy & Minerals	Non-biological resources (note: this should not be primary focus of OE)	Minerals; oil & gas; hydrates; location; occurrence; stability; mixed aggregate	U.S. EEZ	Archive data	Standard Partners
189	Pelagic Environment	Deep pelagic realm	Characterize; biology dynamics	Sea mount & canyons along the continental shelf; greater than 1000 meter depth	Standard Package; deep submersibles; observations on a broader scale; AUV's; acoustic imaging; chem./bio sensors	Standard Partners
206	Pelagic Environment	Pelagic realm - surface to deep sea	What's there? Species diversity issues; location; ID and characterize; function; what's there to exploit & conserve; patterns	Beyond shelf break e.g. Oceanographer Canyon and south	Standard Package; submersibles; ROVs; acoustics; sampling tools to collect gelatinous organisms	Standard Partners

North Atlantic Region Exploration Targets of Interest

1. Atlantic Continental Margin
2. Baltimore Canyons
3. Banquero Bank
4. Bear Mount
5. Browns Bank
6. Buzzards Bay
7. Casco Bay
8. Cashes Ledge
9. Chesapeake Bay
10. Corsair Canyon
11. Emerald Bank
12. Fippennies Ledge
13. Georges Bank
14. Grand Banks
15. Great South Channel
16. Hudson Canyon region
17. Hydrographer Canyon
18. Jeffrey's Ledge
19. Jordan Basin
20. Lydonia Canyon
21. Mid-Atlantic Ridge (not on chart)
22. Nantucket Shoals
23. Narragansett Bay
24. New England Seamount Chain - six volcanic seamounts located off Georges Bank: Bear, Mytilus, Physalia, Picket, Retriever, and Buell
25. Norfolk Canyons
26. Oceanographer Canyon
27. Platts Bank
28. Pueblo Village Communities
29. Stellwagen Basin
30. Stellwagen Bank
31. Tillies Bank
32. Washington Canyons
33. Wilmington Canyons

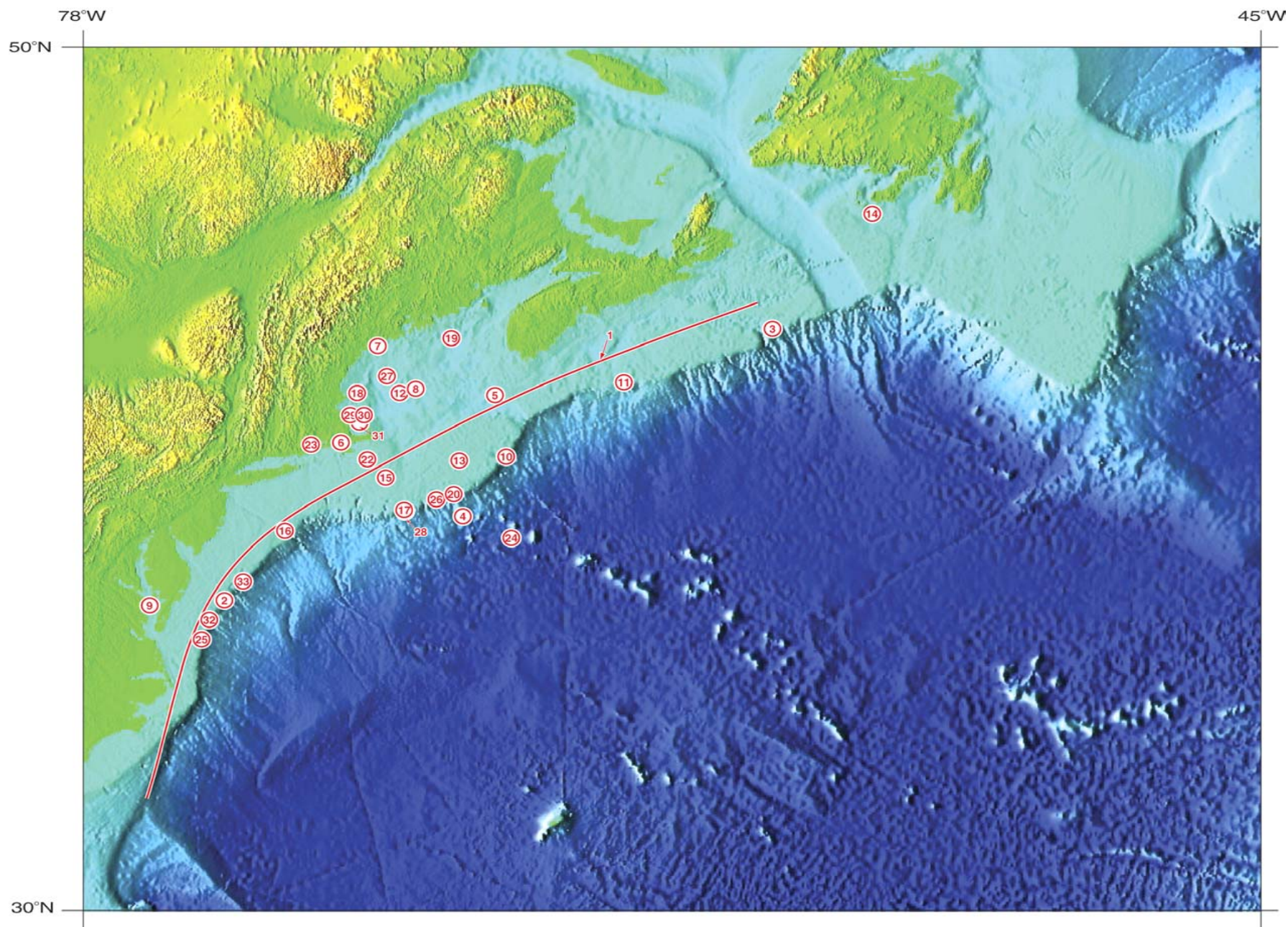


Figure 3-8. North Atlantic Region Exploration Targets of Interest